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APPLICATION NO.	FILING DATE	FIRST NAME OF INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,107	11/29/2001	Desmond R. Lim	MIT8926	3629
55740	7590	04/04/2006	EXAMINER	
GAUTHIER & CONNORS, LLP			FERGUSON, LAWRENCE D	
225 FRANKLIN STREET			ART UNIT	
BOSTON, MA 02110			PAPER NUMBER	

1774

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/997,107

Applicant(s)

LIM ET AL.

Examiner

Lawrence D. Ferguson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-44 is/are pending in the application.
- 4a) Of the above claim(s) 15-28 and 30-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-14 and 29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

1. This action is in response to the amendment mailed January 25, 2006. Claims 9 and 11-14 were amended rendering claims 1, 3-14 and 29 pending, with claims 15-28 and 30-44 withdrawn as a non-elected invention.

***Claim Rejections – 35 USC § 103(a)***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 3-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scalora (U.S. 6,262,830) in view of Knapp et al (U.S. 6,077,569).

Scalora discloses an optical device (column 2, lines 50-53) comprising a plurality of layers, whereby the layers alternate between low and high index of refraction (column 5, lines 1-10). The reference discloses the material is a conductor of electricity (column 7, lines 50-67) and subsequently heat. Scalora discloses band gaps and their widths (column 5, lines 1-59). The reference discloses an index difference between two index layers greater than 0.3 (column 5, lines 32-35) where the invention of Scalora can be

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used to form a mirror structure (column 14, lines 36-47). Because Scalora has a optical device with equivalent materials as the claimed invention, it would have been obvious to one of ordinary skill in the art to include the tunneling junctions between the high index and low index layers of the optical device. In claim 11, the phrase, '...defined by sputtering said alternating layers' introduces a process limitation to the product claim. Additionally, the claim language, '...defined by bonding,' '...defined by utilizing smart cut technique,' and 'defined by utilizing polishing technique' of claims 12-14 are deemed to be product by process claim limitations "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966. In claims 7 and 8, '...ensure that the loss in said optical device will be due to scattering off carriers' and '...exhibit low absorption losses' constitutes a 'capable of' limitation and that such a recitation that a device is 'capable of' performing a function is not a positive limitation, but only requires the ability to so perform.

Although Scalora does not explicitly teach the plurality of high and low index layers having a relationship,  $E_{s,s} > E_{s,s} > \frac{hc}{\lambda}$ , this relationship is an inherent feature of Scalora's optical device. Mere recitation of a newly-discovered function or property, inherently possessed by things in prior art, does not cause a claim drawn to those things to distinguish over prior art. The Patent Office can require applicant to prove that

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subject matter shown to be in prior art does not possess characteristic relied on where it has reason to believe that functional limitation asserted to be critical for establishing novelty in claimed subject matter may be inherent characteristic of prior art. Scalora does not disclose Indium Tin Oxides, doped diamonds or silicon.

Knapp teaches an optical device comprising alternating layers of high refractive index and low refractive index, where the refractive indices includes indium tin oxide, doped silicon and diamond materials (column 1, line 34 through column 2, line 9) having a mirror structure (column 3, lines 19-24). Scalora and Knapp are analogous art because they are both from the field of optical devices. It would have been obvious to one of ordinary skill in the art to include indium tin oxide, doped silicon and diamond material in the high and low index layers of Scalora because Knapp teaches the material provides additional abrasion protection and barrier properties (column 4, lines 11-16).

***Claim Rejections – 35 USC § 103(a)***

4. Claims 1 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scalora et al (U.S. 6,343,167) in view of Knapp et al (U.S. 6,077,569) further in view of Duck et al. (U.S. 5,615,289).

Scalora discloses an optical Fabry-Perot device having a band gap structure comprising alternating layers of refractive materials having first and second index of refractions (column 2, lines 8-37) where one layer has an index of refraction of about 3.4 and the adjacent layer has an index of refraction of about 2.9 (column 8, lines 15-

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24) which results in a difference of 0.5. The claim language, '...allow electricity and heat to be conducted' constitutes a 'capable of' limitation and that such a recitation that a device is 'capable of' performing a function is not a positive limitation, but only requires the ability to so perform. Although Scalora does not explicitly teach the plurality of high and low index layers having a relationship,  $E_{s,j} > E_{s,i} > \frac{hc}{\lambda}$ , this relationship is an inherent feature of Scalora's Fabry Perot device. Mere recitation of a newly-discovered function or property, inherently possessed by things in prior art, does not cause a claim drawn to those things to distinguish over prior art. The Patent Office can require applicant to prove that subject matter shown to be in prior art does not possess characteristic relied on where it has reason to believe that functional limitation asserted to be critical for establishing novelty in claimed subject matter may be inherent characteristic of prior art. Scalora does not disclose Indium Tin Oxides, doped diamonds or silicon.

Knapp teaches an optical device comprising alternating layers of high refractive index and low refractive index, where the refractive indices includes indium tin oxide, doped silicon and diamond materials (column 1, line 34 through column 2, line 9). Scalora and Knapp are analogous art because they are both from the field of optical devices. It would have been obvious to one of ordinary skill in the art to include indium tin oxide, silicon and diamond material in the high index layers of Scalora because Knapp teaches the material provides additional abrasion protection and barrier properties (column 4, lines 11-16). Scalora does not explicitly teach the Fabry-Perot device having a cavity.

Duck discloses a Fabry Perot device comprising alternating high and low index regions (abstract and column 1, lines 48-60) including at least two reflectors (mirrors) comprising cavities comprising selective materials (column 1, lines 52-67). All of the references are analogous art because they are all directed to optical devices. It would have been obvious to one of ordinary skill in the art to include the reflectors (mirrors) comprising cavities with selective materials in the Fabry Perot device of Scalora to reduce the transmission ripple of the device (column 1, lines 50-51).

### ***Response to Arguments***

5. Arguments to rejection made under 35 U.S.C. 103(a) as being unpatentable over Scalora (U.S. 6,262,830) in view of Knapp et al (U.S. 6,077,569) have been considered but are unpersuasive. Applicant argues Scalora does not disclose a plurality of high index layers comprising high index degenerately doped materials and a plurality of low index layers comprising high thermal and electrically conductive materials.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Examiner maintains that Scalora discloses an optical device (column 2, lines 50-53) comprising a plurality of layers, whereby the layers alternate between low and high

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index of refraction (column 5, lines 1-10) and Knapp teaches an optical device comprising alternating layers of high refractive index and low refractive index, where the refractive indices includes indium tin oxide, doped silicon and diamond materials (column 1, line 34 through column 2, line 9). Because prior art discloses alternating low and high index layers having low index layers of indium tin oxide (ITO) and high index layers of doped silicon, they comprise high index degenerately doped materials and high thermal and electrically conductive materials. Applicant further argues Scalora does not teach a mirror structure having the relationship  $E_{s,i} > E_{s,a} > \frac{hc}{\lambda}$ . Examiner maintains Scalora can be used to form a mirror structure (column 14, lines 36-47) and although Scalora does not explicitly teach the plurality of high and low index layers having a relationship,  $E_{s,i} > E_{s,a} > \frac{hc}{\lambda}$ , this relationship is an inherent feature of Scalora's Fabry Perot device.

Arguments to rejection made under 35 U.S.C. 103(a) as being unpatentable over Scalora (U.S. 6,262,830) in view of Knapp et al (U.S. 6,077,569) further in view of Duck et al. (U.S. 5,615,289) have been considered but are unpersuasive. Applicant argues Duck does not teach or suggest alternating high and low index materials using the recited relationship. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Examiner maintains that although the combined references do not explicitly teach the plurality of high and low index layers having a relationship,



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$E_{sJ} > E_{sA} > \frac{hc}{\lambda}$ , this relationship is an inherent feature of Scalora, Knapp and Duck's optical device. Mere recitation of a newly-discovered function or property, inherently possessed by things in prior art, does not cause a claim drawn to those things to distinguish over prior art. The Patent Office can require applicant to prove that subject matter shown to be in prior art does not possess characteristic relied on where it has reason to believe that functional limitation asserted to be critical for establishing novelty in claimed subject matter may be inherent characteristic of prior art. Applicant further argues Duck does not have high index layers comprising high index degenerately doped materials. Examiner maintains that Knapp teaches an optical device comprising alternating layers of high refractive index and low refractive index, where the refractive indices includes indium tin oxide, silicon and diamond materials (column 1, line 34 through column 2, line 9) having a mirror structure (column 3, lines 19-24) where the doped silicone material functions as the high index degenerately doped material in the high index layers.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Ferguson whose telephone number is 571-272-1522. The examiner can normally be reached on Monday through Friday 9:00 AM – 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye, can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).



L. Ferguson  
Patent Examiner  
AU 1774



RENA DYE  
SUPERVISORY PATENT EXAMINER

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